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OCCUPATIONS AND THE PREVALENCE OF DIS/DSM-III MAJOR DEPRESSIVE DISORDER

With adjustment for sociodemographic factors, three occupations have an increased prevalence of major depressive disorders: lawyers, teachers and counselors, and secretaries.

CASES OF ALLEGED ASBESTOS-RELATED DISEASE: A RADIOLOGIC RE-EVALUATION

Upon reassessment of radiographs of 439 active and former tireworkers designated as having asbestiform mineral-related pulmonary disease, only 16 were judged to have a condition consistent with asbestos exposure.

NEW DEVELOPMENTS IN THE NIOSH LIFE TABLE ANALYSIS SYSTEM

The NIOSH Life Table Analysis System has been modified to include new features: direct standardization with a test for linear trend, and analyses by "lagged" exposure.

SAFETY AND PERFORMANCE AMONG UNION AND NONUNION WORKERS IN THE CONSTRUCTION INDUSTRY

Higher levels of safety performance among unionized workers appeared to be largely attributable to their higher relative age.

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Cases of Alleged Asbestos-Related Disease: a Radiologic Re-Evaluation

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Chest radiographs were re-evaluated from 439 active and retired tireworkers previously designated as having a condition consistent with an asbestiform mineral exposure. The review was performed in an independent manner by three board-certified radiologists according to guidelines from an international classification system. The percentage of cases with abnormalities consistent with an asbestiform mineral exposure found separately by the three radiologists was 3.7, 3.0, and 2.7%. Application of an algorithm to form a consensus evaluation indicated that approximately 3.6% (16) of the subjects evaluated may have a condition consistent with an asbestos exposure. A more detailed review, however, revealed that only 11 workers, or 2.5% of the total, would have a reasonable likelihood of having such a condition. Most cases were normal and the majority of abnormalities present on the radiographs evaluated were nonoccupational in origin. Prevalent conditions identified included healed tuberculosis, histoplasmosis, emphysema, discoid atelectasis, effusions, healed rib fractures, scarring due to infection or old inflammatory disease, possible cancer, miscellaneous nonspecific linear markings consistent with cigarette smoking and aging, and heart and vascular system diseases—the latter evidenced by an abnormally large number of subjects with healed coronary artery bypass surgery and pacemaker implants. In summary, the best estimate from this study indicates that possibly 16 (3.6%), but more realistically 11 (2.5%), of the 439 tireworkers evaluated may have a condition consistent with exposure to an asbestiform mineral. This represents a 40-fold difference between the re-evaluation results and the original survey work.

Surveillance associated with workers known or suspected of being exposed to asbestos and other fibrous

minerals is widespread. In diagnosing asbestos-related diseases (in life), the most important medical tool is the chest radiograph. The presence of irregular or linear opacities (especially in the lung bases) and/or the presence of circumscribed or diffuse pleural thickening on the chest walls or diaphragms (especially bilateral) are generally thought to be consistent with an asbestiform mineral exposure. There are, however, several conditions that can mimic asbestos-related diseases.¹ In addition, pleural changes are often misdiagnosed and the shadows seen may be either fat or muscle shadows, scarring adjacent to old disease, or the result of trauma.²

During 1986, 700 to 750 tireworkers at one specific site submitted to medical screening procedures. The procedures involved spirometric testing (with and without a bronchodilator), the administration of a questionnaire on pulmonary symptoms, a cigarette smoking history, a brief occupational history, and the taking of posterior-anterior and left and right oblique radiographs of the chest. Approximately 440 of the patients examined filed legal claims for an asbestos-related injury; therefore, a diagnosis consistent with such filing existed for the subjects. This represents a disease prevalence of nearly 60%. If this was a true generalizable prevalence, it would constitute an epidemic of massive proportions with staggering public and occupational health implications. For each of the subjects with an asbestos-related condition who filed legal claims, the original diagnosis was made by using only the posterior-anterior and oblique chest films, coupled of course with a history of at least potential exposure to asbestos and/or talc. Thus, the purpose of this study was to confirm or refute, although in a select group of enrollees, previous radiologic findings that suggested an unusually high prevalence rate of asbestos-related conditions.

Methods

Posterior-anterior and right and left oblique views of the chest of 439 active and retired tireworkers were

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obtained for evaluation. Identification and other information on the films included subject name, age, and survey number. Three interpreters were used in these trials inasmuch as variability in radiographic evaluations is well documented and an odd number is preferable to resolve discrepancies.³⁻⁶ To reach a final determination on a given case, a median reading of profusion of small opacities was used, thereby not giving undue weight to unusually high or low interpretations. For pleural changes, a consensus (at least two out of three in agreement) was used. All interpreters were initially given no information regarding the films in the set and thus were "blinded" to the purpose of the work in which they were engaged. The physicians participating in these trials were board-certified in radiology, "B" readers,⁷ and members of the American College of Radiology Task Force on the Pneumoconioses. The interpretations were provided in an independent manner, without consultations between radiologists. Standard 1980 International Labour Office (ILO) reference radiographs⁸ were available for use as needed. The importance of following specific instructions outlined in the ILO system⁹ was emphasized and reinforced. These extremely important instructions demand that the radiologist perform more than just mere classification of shadows and also interpret what is seen. In addition, during the interpretation process, each radiologist was assigned an assistant to record observations; the assistant was specially trained and intimately familiar with the 1980 ILO classification system and the use of standardized reporting forms. The posterior-anterior views for subjects were reviewed in a routine manner with the oblique views used at the discretion of the radiologist. Bright lighting was used at the discretion of the radiologist; this use varied depending on individual assessment of the technical quality of the radiographs.

Technical Quality

Inasmuch as the technical quality of the radiograph can dramatically influence the diagnoses given,^{9,10} a general assessment of film quality is important. Most films in these trials were graded as either good or with technical defects unlikely to impair the classification, whereas a minority were considered of poor quality or unacceptable. One of the radiologists was not as charitable as the others and considered 35 films, (8%) to be unreadable. Common technical problems on some films involved one or more of the following: overexposure, underexposure, fogging, poor contrast, grid lines, poor processing, and inadequate inspiration.

Results

From the data in the Table, 16 (3.6%) of the 439 subjects evaluated have conditions (by consensus) that may be consistent with an asbestos exposure. However, at least five of these 16 cases may be seriously questioned because the exact rules for consensus evaluations

TABLE
Consensus Interpretations

Item	No. of Subjects	%
Normal	265	60.4
Conditions of a nonoccupational origin	158	36.0
Parenchymal abnormalities, median profusion > 0/1	7	1.6
Pleural abnormalities, two out of three radiologists in agreement	8	1.8
Both parenchymal and pleural changes	1	0.2
Total	439	100.0

specified in the "Methods" section were applied loosely, allowing for a worst case scenario. If the five nonexact consensus cases are removed from the tabulation, one is left with 11 (2.5%) of the total number of subjects evaluated with a high likelihood of having a condition consistent with exposure to an asbestiform mineral.

It is interesting that the prevalence of likely asbestos-related conditions noted separately by the three radiologists were similar: 3.7, 3.0, and 2.7%. These percentages do not represent subjects in three mutually exclusive sets; hence, the percentages are not additive. In fact, a great deal of overlap exists representing good agreement in interpretation. A large proportion of the cases re-evaluated had what might be considered as completely normal chests for their ages. Also, the vast majority of abnormalities found were nonoccupational in origin and consisted of conditions one might expect in an aged population. Prevalent nonoccupationally related conditions included healed tuberculosis, histoplasmosis, emphysema, discoid atelectasis, effusions, healed rib fractures, scarring due to infection or old inflammatory disease, possible cancer, miscellaneous nonspecific linear markings consistent with cigarette smoking and aging, and heart and vascular system diseases. The best estimate from these results is that possibly 16, but more realistically 11, of the 439 cases evaluated may have a condition consistent with exposure to an asbestiform mineral.

Discussion

Like previous works^{11,12} the present study was prompted by the reporting of exceedingly high rates of alleged asbestos-related disease among rubber workers.

Of 700 to 750 active and retired tireworkers, 439 were considered (initially) to have conditions consistent with exposure to an asbestiform mineral and filed legal claims for an asbestos-related injury. The chest film was the diagnostic aid of paramount importance in the screening procedure, and fortunately the chest films for these cases were available for re-evaluation. The cases were independently re-evaluated by three board-certified radiologists using criteria specified by the ILO classification system relating to dust-induced diseases. The cases re-evaluated were from a select group with an average age of 60.3. More than 90% of the group for which an age was recorded were 50 years of age or older; thus one can expect a host of conditions to exist

on the chest films, i.e., conditions affecting most any segment of the population over 50.

An interesting (and missing) part of the evaluation would have been to include the cases originally considered negative for asbestos-related disease. This was not possible due to administrative necessities and time constraints. Furthermore, the chest radiograph was only one of the diagnostic aids used in classifying subjects as to whether or not they might have an asbestos-related condition. Nevertheless, of the diagnostic procedures used, chest radiography is the only one that can essentially stand alone in making a diagnosis of a condition consistent with an exposure to asbestos or other fibrous material, i.e., given an appropriate exposure history.

At the present time, it is unclear if the highly elevated prevalence of alleged asbestos-related disease reported initially by others at this one particular site is a pattern repeated at other sites in the United States. Nevertheless, the data from this re-evaluation study suggest that the prevalence of disease noted is mistakenly high. A review of the 439 subjects initially deemed positive for asbestos-related disease shows only 16, and more realistically 11 (2.5%), as having conditions consistent with exposure to an asbestiform mineral. It is possible that even the 2.5% prevalence is overstated. For example, many of the subjects were classified as category 1/0, representing only minimal changes which could be the consequence of cigarette smoking, aging, or crowding of the vascularity in the lung bases due to poor inspiration. Moreover, these opacities could be the result of other conditions that mimic asbestosis. The remaining subjects had completely normal chests or indications of a variety of nonoccupational conditions that affect the general population. Thus, the estimate of possible asbestos-related disease we obtained in the re-evaluation trials is 40-fold lower than results from the original survey work.

In summary, the overall prevalence of asbestos-related or other occupationally induced conditions in the sample re-evaluated is not of epidemic proportions and widespread alarm is unwarranted. Ordinary medical and environmental surveillance is recommended.

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